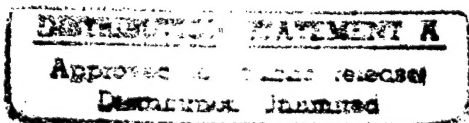


The US Army's Center for Strategy and Force Evaluation

MEMORANDUM REPORT
CAA-MR-96-77

**WARTIME REQUIREMENTS, FY 2003 -
CHEMICAL DEFENSE EQUIPMENT
(WARREQ-03 CHEM)**

DECEMBER 1996



19970110 006

PREPARED BY
OPERATIONAL CAPABILITY ASSESSMENTS -
SOUTHWEST ASIA DIVISION

US ARMY CONCEPTS ANALYSIS AGENCY
8120 WOODMONT AVENUE
BETHESDA, MARYLAND 20814-2797

DTIC QUALITY INSPECTED 4

DISCLAIMER

The findings of this report are not to be construed as an official Department of the Army position, policy, or decision unless so designated by other official documentation. Comments or suggestions should be addressed to:

**Director
US Army Concepts Analysis Agency
ATTN: CSCA-SW
8120 Woodmont Avenue
Bethesda, MD 20814-2797**

CAA Memorandum Reports are used for the convenience of the sponsors or the analysts to record substantive work done in quick reaction studies and major interactive technical support activities; to make available preliminary and tentative results of analyses or of working group and panel activities; or to make a record of conferences, meetings, or briefings, or of data developed in the course of an investigation. Memorandum Reports are reviewed to assure that they meet high standards of thoroughness, objectivity, and sound analytical methodology.

REPORT DOCUMENTATION PAGE			Form Approved OPM NO. 0704-0188	
Public reporting burden for this collection information is estimated to 1 hour per response, including the time for reviewing instructions, searching existing data sources gathering and maintaining the data needed, and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information. Including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.				
1. AGENCY USE ONLY (Leave Blank)		2. REPORT DATE December 1996	3. REPORT TYPE AND DATES COVERED Final, Nov - Dec 96	
4. TITLE AND SUBTITLE Wartime Requirements, FY 2003 - Chemical Defense Equipment (WARREQ-03 CHEM)			5. FUNDING NUMBER	
6. AUTHOR(S) Mr. Frank O. Gould				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) US Army Concepts Analysis Agency 8120 Woodmont Avenue Bethesda, MD 20814-2797			8. PERFORMING ORGANIZATION REPORT NUMBER CAA-MR-96-77	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) ODCSOPS, HQDA (DAMO-FDB) The Pentagon Washington, DC 20310			10. SPONSORING/ MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; dissemination unlimited			12b. DISTRIBUTION CODE A	
13. ABSTRACT (Maximum 200 words) This analysis provided wartime requirements for approximately 18 items of nuclear, biological, and chemical (NBC) defense equipment which were not included in the original WARREQ-03 equipment list of items that were considered in that study, conducted in late CY 95 and documented in the spring of 1996. The equipment list of line item numbers was updated, and the Equipment Loss Consolidator (ELCON) program portion of the CALAPER process was rerun to determine wartime attrition of those systems of interest.				
14. SUBJECT TERMS Projected wartime losses (PWL), wartime requirements (WARREQ), major regional contingency (MRC)			15. NUMBER OF PAGES 13	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED	20. LIMITATION OF ABSTRACT SAR	

**WARTIME REQUIREMENTS, FY 2003 - CHEMICAL DEFENSE EQUIPMENT
(WARREQ-03 CHEM)**

1. SPONSOR. Headquarters, Department of the Army (HQDA), Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS) (DAMO-FDB).

2. BACKGROUND. A recent review of the WARREQ-03 equipment requirements results, completed in early 1996, revealed that approximately two dozen items of nuclear, biological, and chemical (NBC) defense equipment were either missing from the study's master line item number (LIN) list, or were represented by older or obsolete LINs. An updated list of these items was provided by DAMO-FDB, the Chemical and NBC Defense Division, Program Requirements, Readiness, and Studies Team, for further analysis.

3. PURPOSE. To rerun the equipment attrition portion of the wartime requirements process (fiscal year (FY) 2003) in order to determine losses of appropriate NBC defense equipment for war reserve purposes.

4. OBJECTIVE. To determine projected wartime losses (PWL) for selected items of NBC defense equipment using the same scenario and campaign assumptions as were used for the recently completed WARREQ-03 studies.

5. ASSUMPTIONS. All force structure availability and other campaign assumptions used in support of the Support Force Requirements Analysis - 2003 (SRA-03) and WARREQ-03 studies will remain the same.

6. ESSENTIAL ELEMENTS OF ANALYSIS. What are the detailed war reserve requirements for the selected items of NBC defense equipment resulting from the simulated campaigns?

7. METHODOLOGY

a. Campaign results from the WARREQ-03 studies for both major regional contingencies (MRCs) (East and West) were used as the basis for running the Equipment Loss Consolidator (ELCON).

b. The master LIN list was revised to reflect the additions/deletions of NBC protective equipment as directed by DAMO-FDB point of contact (POC), LTC Leonard Izzo (703-614-8607) (see Appendix B).

8. ANALYSIS RESULTS. Projected wartime losses for the specified items of NBC protective equipment are shown in Appendix A.

9. QUICK REACTION ANALYSIS (QRA) PRODUCTS. PWL data pertaining to the selected NBC protective equipment were provided in tabular form to the DAMO-FDB POC on 21 November 1996. This memorandum report provides the documentation for that effort.

10. POINT OF CONTACT. Mr. Frank O. Gould, Operational Capability Assessments - Southwest Asia Division, US Army Concepts Analysis Agency (CAA), 8120 Woodmont Avenue, Bethesda, MD 20814-2797, (301) 295-6955.

11. ANALYSIS TEAM MEMBERS

Mr. Frank O. Gould, Team Leader
Mr. David E. Williams, CALAPER Analyst
Mr. Barry P. Groves, Data Management Analyst

APPENDIX A

PROJECTED WARTIME LOSSES (PWL), NBC DEFENSE EQUIPMENT, FY 2003

PWL, MRC-East

LIN	item name	Time period											
		1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110	111-120
A32355	Alarm, chem agt, auto portable, manpack: M8A1												
	TOE quantity	1802	3076	4343	5104	5764	6227	6895	7319	7798	8309	8425	8491
	Losses	27	21	20	8	7	3	4	1	3	1	0	0
	Cum losses	27	48	68	76	83	86	90	91	94	95	95	95
A32638	Alarm, chem agt, auto remote, M21												
	TOE quantity	6	6	9	12	12	12	12	12	12	12	12	12
	Losses	0	0	0	0	0	0	0	0	0	0	0	0
	Cum losses	0	0	0	0	0	0	0	0	0	0	0	0
C12815	Carrier, smk gen, FT armor, M1059												
	TOE quantity	7	13	17	20	20	20	20	20	20	20	20	20
	Losses	1	0	0	0	0	0	0	0	0	0	0	0
	Cum losses	1	1	1	1	1	1	1	1	1	1	1	1
C79000	Coll prot equip, NBC simplified, M20												
	TOE quantity	151	242	295	342	422	445	489	512	527	545	558	561
	Losses	2	2	1	1	0	0	0	0	0	0	0	0
	Cum losses	2	3	4	6	6	6	6	6	6	6	6	6
F81880	Decon appar, per drvn, skid mtd, multi, M12A1												
	TOE quantity	20	35	42	51	59	61	78	88	117	143	149	154
	Losses	2	0	0	0	0	0	0	0	0	0	0	0
	Cum losses	2	2	2	2	2	2	2	2	2	2	2	2
G51840	Gen set, smk, mech, pulse jet, M157												
	TOE quantity	0	18	18	18	18	18	18	18	35	42	42	42
	Losses	0	0	0	0	0	0	0	0	0	0	0	0
	Cum losses	0	0	0	0	0	0	0	0	0	0	0	0
G58151	Gen, smk, mech, mtzd for DP unit, M56												
	TOE quantity	7	30	43	60	60	60	106	132	185	245	262	276
	Losses	1	1	1	1	0	0	0	0	0	0	0	0
	Cum losses	1	2	3	4	4	4	4	4	4	4	4	4
M12350	NBC: mask, chem/bio, protective M43												
	Auth	120	223	457	551	808	932	935	936	942	1016	1023	1023
	Losses	6	3	5	2	3	0	0	0	0	0	0	0
	Cum losses	6	9	14	16	19	19	19	19	19	19	19	19
M18526	NBC: mask, chem/bio, cbt veh												
	Auth	4558	8377	13007	16954	19800	19932	20263	20410	20487	20635	21235	21408
	Losses	289	85	121	64	18	1	2	0	2	0	1	0
	Cum losses	289	374	495	559	577	578	580	580	581	581	582	582
R20684	Radiac set, AN/VDR-2												
	Auth	2466	3713	5335	6459	7339	7818	8565	8984	9465	10205	10382	10487
	Losses	23	25	25	10	8	2	5	1	5	1	0	0
	Cum losses	23	48	73	83	91	93	98	99	104	105	105	105
R30925	Radiac set, AN/PDR-75												
	Auth	573	754	1013	1210	1391	1500	1696	1813	1894	2000	2037	2059
	Losses	4	4	4	2	1	1	1	0	1	0	0	0
	Cum losses	4	8	12	14	15	16	17	17	18	18	18	18
Z04910	Alarm, chem agt, auto, M22												
	Auth	516	630	762	1015	1447	1630	1801	1876	1892	1921	2012	2085
	Losses	5	3	3	4	3	1	1	0	0	0	0	0
	Cum losses	5	8	11	15	18	19	20	20	20	20	20	20
Z48015	Gen, smk, mech, obscurant, M58												
	Auth	8	14	14	36	42	55	63	69	84	84	84	84
	Losses	1	0	0	0	0	0	0	0	0	0	0	0
	Cum losses	1	1	1	1	1	1	1	1	1	1	1	1
Z75367	Pocket radiac												
	Auth	600	734	902	1326	2050	2318	2542	2650	2675	2736	2911	3042
	Losses	29	7	6	9	5	1	1	0	0	0	0	0
	Cum losses	29	36	42	51	56	57	58	58	58	58	58	58
Z78133	Chem/bio prot shelter sys (CBPS)												
	TOE quantity	24	33	39	54	68	83	86	86	86	86	86	86
	Losses	0	0	0	0	0	0	0	0	0	0	0	0
	Cum losses	0	0	0	0	0	0	0	0	0	0	0	0
Z93144	NBC recon sys, M93												
	TOE quantity	0	0	0	0	0	0	0	0	0	0	0	0
	Losses	0	0	0	0	0	0	0	0	0	0	0	0
	Cum losses	0	0	0	0	0	0	0	0	0	0	0	0

PWL, MRC-W

LIN	Item name	Time period					
		1-10	11-20	21-30	31-40	41-50	51-60
A32355	Alarm, chem agt, auto portable, manpack: M8A1						
	TOE quantity	617	1727	3286	4330	4756	4860
	Losses	31	50	61	71	69	41
	Cum losses	31	81	142	213	282	323
A32638	Alarm, chem agt, auto remote, M21						
	TOE quantity	2	26	49	61	61	61
	Losses	0	1	1	1	1	1
	Cum losses	0	1	2	3	4	5
C12815	Carrier, smk gen, FT armor, M1059						
	TOE quantity	1	7	35	35	35	35
	Losses	1	1	2	2	3	1
	Cum losses	1	2	4	6	9	10
C79000	Coll prot equip, NBC simplified, M20						
	TOE quantity	42	43	184	229	235	236
	Losses	2	2	3	3	3	2
	Cum losses	2	4	7	10	13	15
F81880	Decon appar, per drvn, skid mtd, multi, M12A1						
	TOE quantity	4	23	51	73	74	77
	Losses	0	1	2	3	3	1
	Cum losses	0	1	3	6	9	10
G51840	Gen set, smk, mech, pulse jet, M157						
	TOE quantity	25	42	48	63	63	65
	Losses	2	1	1	2	1	1
	Cum losses	2	3	4	6	7	8
G58151	Gen, smk, mech, mtd for DP unit, M56						
	TOE quantity	31	86	146	216	216	218
	Losses	20	13	7	12	18	7
	Cum losses	20	33	40	52	70	177
M12350	NBC: mask, chem/bio, protective M43						
	Auth	0	133	674	1185	1185	1185
	Losses	0	8	28	42	39	21
	Cum losses	0	8	36	78	117	138
M18526	NBC: mask, chem/bio, M42						
	Auth	4459	10450	20009	20773	20976	21076
	Losses	476	771	1088	1226	1122	590
	Cum losses	476	1247	2335	3561	4683	5273
R20684	Radiac set, AN/VDR-2						
	Auth	810	2089	3657	4886	5480	5577
	Losses	38	52	55	67	65	38
0	Cum losses	38	90	145	212	277	315
Z04910	Alarm, chem agt, auto, M22						
	Auth	81	163	423	581	655	666
	Losses	4	5	8	11	10	6
	Cum losses	4	9	17	28	38	44
Z48015	Gen, smk, mech, obscurant, M58						
	Auth	1	14	7	35	35	35
	Losses	0	0	1	1	1	0
	Cum losses	0	0	1	2	3	3
Z75367	Pocket radiac						
	Auth	184	376	811	1020	1101	1119
	Losses	16	25	36	51	49	27
	Cum losses	16	41	77	128	177	204
Z78133	Chem/bio prot shelter sys (CBPS)						
	TOE quantity	69	101	204	275	294	299
	Losses	3	3	4	5	6	5
	Cum losses	3	6	10	15	21	26

APPENDIX B**NBC DEFENSE EQUIPMENT****DAMO-FDB's Revised NBC Defense Equipment List**

Delete LINs	Nomenclature
A32060	Alarm, Cml Agt Auto, Portable, Manpack: M8
E00533	Charger, Radiac, PP-1578/PD
Q20798	Radiacmeter, IM-9/PD
Q21209	Radiacmeter, IM-147/PD
Q21483	Radiacmeter, IM-174/PD

Additional LINs	Nomenclature
A32355	Alarm, Cml Agt Auto, Portable, Manpack: M8A1
A32638	Alarm, Cml Agt Auto, Remote Sensing: M21
C12815	Carrier, Smk Generator, Full Tracked Armor: M1059
C79000	Coll Prot Equip, NBC, Simplified: M20
F81880	Decon App, Per Drvn, Skid Mounted, Multi: M12A1
G51840	Generator Set, Smk, Mechanical, Pulse Jet: M157
G58151	Generator, Smk, Mechanical, Motorized for Dual Purpose Unit: M56
M12350	Mask, Chemical/Biological, Protective: M43
M18526	Mask, Chemical/Biological, Combat Vehicle: M42
R20684	Radiac Set: AN/VDR-2
R30925	Radiac Set: AN/PDR-75
Z04910	Alarm, Cml Agt Automatic: M22
Z41179*	Alarm Biological Agt Auto Integrated Detection Sys: M31
Z41944*	Mask, Chemical/Biological, Aircraft: M43A1
Z48015	Generator, Smk, Mech, Mech Smk Obscurant Sys: M58
Z75367	Pocket Radiac
Z78133	Chemical/Biological Protected Shelter System (CBPS)
Z93144*	Reconnaissance System, NBC: M93

POC: LTC Leonard Izzo, DAMO-FDB (703) 614-8607.

*These two LINs did not show up in the final requirements results in either theater. Either they were not in the current Total Army Equipment Deployment Plan (TAEDP), which provides time-phased densities of the equipment into the theater, or the densities were so few, i.e., less than six, and the percent attrition was so small, i.e., 0.001, that the attrition was insignificant. The third LIN, Z93144, did not show up in the MRC-W results, presumably for the same reason(s).

DAMO-FDB's Cross-reference LIN List*

Old LIN	Nomenclature	Replacement LIN	Nomenclature
A32355	Alarm, Cml Agt Auto, Portable, Manpack: M8A1	Z04910	Alarm, Cml Agt Automatic: M22
C05701	Chemical Agent Monitor, CAM		
C12815	Carrier, Smk Gen, FT Armor: M1059	Z48015	Generator, Smk, Mech, Mech Smk Obscurant Sys: M58
C79000	Coll Prot Equip, NBC, Simplified: M20		
D82404	Decon App, Pwr Driven, LtWt: M17		
F81880	Decon App, Per Drvn, Skid Mounted, Multi: M12A1	Z21034/ Z21102/ Z31551	Decon App: M19/Decon App, HP Wash: M22/Decon App, DS2 Pumper Scrubber
G51840	Gen Set, Smk, Mech, Pulse Jet: M157	G58151	Gen, Smk, Mech, Mtzd for DP Unit: M56
M10936	Mask, Protective, Tank: M25	M18526	Mask, Chem/Bio, Cbt Veh: M42
M11621	Mask, Chem, Protective, Acft: M24	M12350	Mask, Chem/Bio, Protective: M43
M11895	Mask, CBR, Protective, Field: M17	M12418	Mask, Chem/Bio, Protective: M40
M12350	Mask, Chem/Bio, Protective: M43	Z41944	Mask, Chem/Bio, Aircraft: M43A1
Q19339	Radiac Set: AN/PDR-27	R20684	Radiac Set: AN/VDR-2
Q19681	Radiac Set: AN/PDR-56(F)	R30993	Radiac Set: AN/PDR-77
Q19750	Radiac Set: AN/PDR-60	R30993	Radiac Set: AN/PDR-77
Q21483	Radiacmeter: IM-174/PD	R20684	Radiac Set: AN/VDR-2
T00474	Shelter Sys, Coll Prot, Cml/BioM M51	Z78133	Chem/Bio Prot Shelter System (CBPS)
Z93144	Reconnaissance System, NBC: M93	Z93212	Reconnaissance System, NBC: M93A1
		A32638	Alarm, Cml Agt, Auto, Remote Sensing: M21
		R30925	Radiac Set: AN/PDR-75
		T62350	Test Kit, Mask, Protective: M41
		Z33474	Detection Sys, Bio Agt, Long-range Standoff System: M94
		Z41179	Alarm Bio Agt Auto Integrated Detection System: M31
		Z42012	Mask, Chem/Bio, Aircrew: M45

*This list provides a cross-reference between old and replacement LINs. Since there is a mix of equipment issued to the field, some of these items will be existence at the same time, i.e., FY 2003. An example of this is the chemical agent alarm, M8A1 (A32355) and its replacement chemical agent alarm, M22 (Z04910).

APPENDIX C

REQUEST FOR ANALYTICAL SUPPORT

P A R T 1		REQUEST FOR ANALYTICAL SUPPORT	
1. Performing Directorate/ Division: CSCA - SWA		2. Account Number: 97020	
3. Type Effort (Enter one): <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <input type="checkbox"/> Mode (Contract=C) <input type="checkbox"/> Q </div> <div> <input checked="" type="checkbox"/> S - Study <input type="checkbox"/> Q - QRA <input type="checkbox"/> P - Project <input type="checkbox"/> R - RAA </div> </div>		4. Tasking (Enter one): <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <input checked="" type="checkbox"/> V </div> <div> <input type="checkbox"/> F - Formal Directive <input type="checkbox"/> I - Informal <input type="checkbox"/> V - Verbal </div> </div>	
5. Title: WARREQ-033 WARTIME REQUIREMENTS-FY03 CHEM			
6. Acronym: WRQ-033		7. Date Request Received: 13 Nov 96	
8. Date Due: 29 Nov 96		9. Requester/Sponsor (i.e., DCSOPS): ODCSOPS (DAMO)	
10. Sponsor Division (i.e., SSW, N/A): FDB		11. Impact on Other Studies, QRA, Projects, RAA: NONE	
12. Product Required: BRIEFING CHARTS, COMPUTER DISK, MEMO RPT			
13. Estimated Resources Required:		a. Estimated PSM: 1/2 PSM	
b. Estimated Funds: N/A		c. Models Req'd: CALAPER; ELCON	
d. Other: N/A		14. Objective(s)/Abstract: A REVIEW OF WARREQ-033, EQUIPMENT REQUIREMENTS RESULTS REVEALED THAT APPROXIMATELY 2 DOZEN ITEMS OF NBC DEFENSE EQUIPMENT WERE EITHER MISSING FROM THE CALAPER MASTER LHM LIST, OR WERE REPRESENTED BY OLDER OR OBSOLETE LHM. AN UPDATED LIST OF THESE ITEMS HAVE BEEN PROVIDED BY LTC L. IZZO, DAHO-FDB, WITH A REQUEST TO MODIFY THE CALAPER DATABASE + TO RERUN THE ELCON TO PROVIDE A REQUIREMENTS BASIS FOR THESE ITEMS. THIS QRA IS ALSO BEING COORDINATED WITH CAA'S EAD/NBC DIVISION AND THEIR CHEM-RATES PROCESS	
15. Study Director/POC:		Last Name: GOULD	
First: FRANK O.		Date: 14 Nov 1996	
Signature: <i>Frank O. Gould</i>		Phone#: 295-1617	
GO TO BLOCK 20 If this is A STUDY. See Tab C of the Study Directors' Guide for preparation of a Formal Study Directive.			
P A R T 2			
16. Background/Statement of Problem*:			
17. Scope of Work*:			
18. Issues for Analysis*:			
19. Milestones/Plan of Action*: a - 13 Nov 1996 - RECEIPT OF UPDATED NBC DEF EQUIPMENT LIST b - 14-20 Nov - UPDATE ELCON FILES / RERUN WARREQ-033 c - 21-22 Nov - ASSEMBLE NEW RESULTS d - 25-27 Nov - PREPARE BRIEFING CHARTS/RESULTS IN DISK FORMAT e - 2-5 DEC - COMPLETE DOCUMENTATION			
20. Division Chief Concurrence:		<i>FR. COL. JAMES L. HILLMAN</i> Date: 14 Nov 96	
21. Sponsor (COL/DA Div Chief) Concurrence:		LTC LEONARD IZZO, DAHO-FDB Date: 14 Nov 96	
22. Sponsor Comments*:			